DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 1/26/2010 have been fully considered but they are not persuasive.

With respect to applicants arguments presented regarding Le Scolan (Of record), the applicant emphasizes the first and second networks described have network cycle masters, for each network a single node dictates the timing in the network. Furthermore the applicant explains, "*adjustment of the timing of the second network so as to be in synchronism with the first network is simply a matter of adjusting the network cycle master of the second network. All other nodes in the second network then follow the timing dictated by the network cycle master*" (Top of Pg. 7)

The examiner agrees with applicants assertion that "all other nodes" follow the network cycle master because all the nodes of the network receive cycle start signals (i.e., timing-related data) in order for both networks to be synchronized (**see Col. 15 lines 32-48**). Thus, a sign of the difference is communicated to a plurality of other computer nodes in the first network. Synchronization node CM_B communicates to all the nodes a cycle start signal in reference to the value offset corrected by the network cycle master CM_B. This in turn synchronizes the plurality of other computer nodes in the first network to CM_B, CM_A and its respective network, hence, communicating a sign of the difference to the plurality of other computer nodes in the first network, (**see Col. 4 line 65 - Col. 5 lines 1-2**).

With respect to applicants arguments presented regarding Kitoki (Of Record), the arguments are moot because Le Scolan (Of Record) teaches a synchronization unit capable of communicating to a plurality of other computer nodes in the first network a sign of the difference between the first network timing information and the second network timing information to allow the plurality of other computer nodes in the first network to alter their network timing information directed by the sign of the difference.

Furthermore, regarding Kitoki (Of Record), examiner agrees with applicants argument regarding the "*master station processes timing errors for each slave station individually*" (Pg. 8). However, the disclosure of Kitoke (Of record) is referenced for the teachings of reducing a network timing difference in sufficiently small predetermined step values between a master station and a slave station. The timing difference of the two networks of Le Scolan (Of record) is corrected in one adjustment. By implementing the teachings of Kitoki (Of Record), the timing difference between both networks can be adjusted (i.e., synchronized), in small predetermined steps.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made

> to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3-7, and 9-16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Le Scolan et al. (USP 7,058,729) in view of Kotaki (USP 5,276,659).

Regarding Claim 1, Le Scolan discloses a computer node (**see Fig. 2, Synchronization nodes "Cma"**) for operating in a system comprising a plurality of network clusters (**See Fig. 2 & Col. 5 lines 32-33 i.e., "first, second network"**), wherein a number of network clusters comprise a plurality of computer nodes (**see Col. 11 lines 5-8**), the computer node comprising:

a synchronization unit (**See Fig. 2, nodes A,B**) for comparing network timing information (**see Col. 12 lines 17-31 i.e., reference time**) for a first network with network timing information for a second network (**see Col. 15 lines 10-31**)

and for communicating to a plurality of other computer nodes in the first network a sign of the difference (**see Col. 15 line 32 *i.e., offset supplied as a number of clock pulses***) between the first network timing information and the second network timing information to allow the plurality of other computer nodes in the first network to alter their network timing information directed by the sign of the difference, (**see Col. 15 lines 32-48 i.e., *"CMb" makes a correction in its cycle time register CTR in order to remain synchronized with the synchronization node "CMa" and then sends to all the nodes on communication bus "bB" (i.e., first network), cycle start signals in***

order to synchronize the different clocks of the nodes with the clock of the node "CMb")

Referring to Fig. 2, Le Scolan discloses the offset (*i.e., sign of the difference*) refers to the difference of reference time events between to buses "bA" and "bB" which are compared and communicated to cycle masters "Cma" and "Cmb" through respective interconnect nodes A,B, (**see Col. 15 lines 22-32 & Col. 10 lines 26-42**).

Le Scolan teaches a first network and second network are able to synchronize to one another by reading and calculating each of their respective clock pulses (*i.e., network timing information*) at the appearance of a reference event, (**see Col. 4 line 60 - Col. 5 lines 1-18**).

Le Scolan does not disclose wherein a network timing difference between the first network and the second network is thereby reduced responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign to avoid loss of local synchronization with the plurality of other computer nodes in the first network, however the limitation is known in the art of communications by evidence of Kotaki (USP 5,726,659)

(Referring to Fig. 1, Kotaki illustrates a network station including a master station 11o and multiple slave stations "11i....11n", where *the master station finding a delay or gain*

time from time information sent from the slave station for each given time and reference time, finding a time correction coefficient and time correction number of the respective slave station on the basis of the given time and delay or gain time, and transmitting the time correction coefficient and time correction number to the slave station; and the respective slave station, responsive to each timer check signal of its internal timer, for calculating the time correction coefficient and time check signal sent from the master station to obtain a correction timer check signal, comparing a time correction number sent from the master station and its own time correction number, repeating a time correction operation until there occurs a coincidence between the two, and correcting a time difference between a reference time of the master station and an internal time of the respective slave station, a plurality of times, upon receipt of each timer check signal, (**see Col. 2 lines 3-30**).

Kotaki discloses a network timing difference between a master station and a respective slave station (**see Col. 3 lines 8-12 i.e., timing difference |e|**) is corrected (*i.e., reduced or increased*) responsive to the sign of the difference received, (**see Col. 3 line 55 - Col. 4 lines 1-10**)

and in sufficiently small predetermined step values (**see Col. 3 lines 20-45 *i.e., predetermined time correction number N is assigned based on timing difference |e|, and a correction coefficient D)*** in accordance with the sign (**see *Col. 4 lines 25-51 i.e., time synchronization can be obtained between the master station and the slave station after 10 system times (small steps))***.

Kotaki teaches *since the time correction coefficient and time correction number as found based on the time difference of the respective slave station are sent to the slave station, it is possible to perform time correction at the respective slave station upon receipt of the time correction data. Further, the respective slave station can secure time synchronization (i.e., avoid local loss), while very small step like time correction is being done, enabling a proper processing or a smoother operation to be obtained in various control operations*, (**see Col. 4 line 63 – Col. 5 lines 1-5**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention for a network timing difference between the first network and the second network to be thereby reduced responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign to avoid loss of local synchronization with the plurality of other computer nodes in the first network, by including the teachings of Kotaki who discloses a network timing difference between a master station and a respective slave station from a plurality of slave stations, is corrected responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign, within the teachings of Le Scolan who discloses comparing network timing information for a first network with network timing information for a second network using a synchronization unit, and for communicating to a plurality of other computer nodes in the first network a sign of the difference between the first network timing information and second network timing information to allow the plurality of other computer nodes in the first network to alter

their network timing information directed by the sign of the difference, because the teaching lies in Kotaki, that a slave station can secure time synchronization while very small step like time correction is being done, enabling a proper processing or a smoother operation to be obtained in various control operations.

Regarding Claim 3, the combination of Le Scolan in view of Kotaki disclose, a computer node according to claim 1, wherein the network timing information corresponds to the phase of the network clock, **(Referring to Fig. 1 Le Scolan illustrates the phase offset in the computer node, see Col. 20 lines 24-40)**

Regarding Claim 4, the combination of Le Scolan in view of Kotaki disclose a computer node according to claim 1, wherein the synchronization unit is arranged to provide the sign of the difference to the second network to allow the second network to alter its network timing information to allow the network timing difference between the first network and the second network to be reduced, **(The difference is calculated and synchronization is performed to the applied network, see Le Scolan, Col. 6 lines 38-60)**.

Regarding Claim 5, the combination of Le Scolan in view of Kotaki disclose, a computer node according to claim 1, wherein the computer node is arranged to be coupled to the

first network, (**The first and second network described in Col. 5 lines 59-61, are illustrated by Le Scolan in Fig. 2, where node "B" is coupled to the first network**).

Regarding Claim 6, the combination of Le Scolan in view of Kotaki, disclose a computer node according to claim 1, wherein the computer node is arranged to be coupled to the second network via a second computer node, (**The first and second network described in Col. 5 lines 59-61, are illustrated by Le Scolan in Fig. 2, where node "A" is coupled to the second network**).

Regarding Claim 7, Le Scolan discloses a system comprising a plurality of network clusters comprising:

a first network, a second network, (**See Fig. 2 & Col. 5 lines 25-33 i.e., "first, second network"**),

a computer node having a synchronization unit (**See Fig. 2, nodes A,B**) for comparing network timing information (**see Col. 12 lines 17-31 i.e., reference time**) for the first network with network timing information for the second network (**see Col. 15 lines 10-31**) and for communicating to a plurality of other computer nodes in the first network a sign of the difference between the first network timing information and the second network timing information (**see Col. 15 lines 32-48 i.e., *"CMb" makes a correction in its cycle time register CTR in order to remain synchronized with the***

synchronization node "CMa" and then sends to all the nodes on communication bus "bB" (i.e., first network), cycle start signals in order to synchronize the different clocks of the nodes with the clock of the node "CMb")

Referring to Fig. 2, Le Scolan discloses the offset (*i.e., sign of the difference*) refers to the difference of reference time events between to buses "bA" and "bB" which are compared and communicated to cycle masters "Cma" and "Cmb" through respective interconnect nodes A,B, (**see Col. 15 lines 22-32 & Col. 10 lines 26-42**).

Le Scolan teaches a first network and second network are able to synchronize to one another by reading and calculating each of their respective clock pulses (*i.e., network timing information*) at the appearance of a reference event, (**see Col. 4 line 60 - Col. 5 lines 1-18**).

Le Scolan does not disclose that a network timing difference between the first network and the second network is thereby reduced by the plurality of other computer nodes in the first network responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign to avoid loss of local synchronization with the plurality of other computer nodes in the first network, the reduction of the timing differences being directed by the sign of the network timing difference between the first network and the second network, however the limitation is known in the art of communications by evidence of Kotaki (USP 5,726,659).

(Referring to Fig. 1, Kotaki illustrates a network station including a master station 11o and multiple slave stations "11i....11n", where *the master station finding a delay or gain time from time information sent from the slave station for each given time and reference time, finding a time correction coefficient and time correction number of the respective slave station on the basis of the given time and delay or gain time, and transmitting the time correction coefficient and time correction number to the slave station; and the respective slave station, responsive to each timer check signal of its internal timer, for calculating the time correction coefficient and time check signal sent from the master station to obtain a correction timer check signal, comparing a time correction number sent from the master station and its own time correction number, repeating a time correction operation until there occurs a coincidence between the two, and correcting a time difference between a reference time of the master station and an internal time of the respective slave station, a plurality of times, upon receipt of each timer check signal*, (**see Col. 2 lines 3-30**).

Kotaki discloses a network timing difference between a master station and a respective slave station (**see Col. 3 lines 8-12 i.e., timing difference |e|**) is corrected (*i.e., reduced or increased*) responsive to the sign of the difference received, (**see Col. 3 line 55 - Col. 4 lines 1-10**)

and in sufficiently small predetermined step values **(see Col. 3 lines 20-45 *i.e., predetermined time correction number N is assigned based on timing difference |e|, and a correction coefficient D)*** in accordance with the sign (**see *Col. 4 lines 25-***

51 i.e., time synchronization can be obtained between the master station and the slave station after 10 system times (small steps)).

Kotaki discloses the reduction of the timing differences being directed by the sign of the network timing difference, (**see Col. 2 lines 10-30 i.e.,** ***respective slave station repeats a time correction operation by reducing the time difference if the master station finds a gain time from the time information or increasing the time difference if the master station finds a delay from the time information****)*

Kotaki teaches *since the time correction coefficient and time correction number as found based on the time difference of the respective slave station are sent to the slave station, it is possible to perform time correction at the respective slave station upon receipt of the time correction data. Further, the respective slave station can secure time synchronization (i.e., avoid local loss), while very small step like time correction is being done, enabling a proper processing or a smoother operation to be obtained in various control operations*, (**see Col. 4 line 63 – Col. 5 lines 1-5**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention for having the network timing difference between the first network and the second network thereby reduced by the plurality of other computer nodes in the first network responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign to avoid loss of local synchronization with the plurality of other computer nodes in the first network, the

reduction of the timing differences being directed by the sign of the network timing difference between the first network and the second network, by including the teachings of Kotaki who discloses a network timing difference between a master station and a respective slave station from a plurality of slave stations is corrected responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign, within the teachings of Le Scolan who discloses a first and second network, a computer node having a synchronization unit for comparing network timing information for a first network with network timing information for a second network, and for communicating to a plurality of other computer nodes in the first network a sign of the difference between the first network timing information and second network timing information, because the teaching lies in Kotaki, that a slave station can secure time synchronization while very small step like time correction is being done, enabling a proper processing or a smoother operation to be obtained in various control operations.

Regarding Claim 9, the combination of Le Scolan in view of Kotaki disclose a system according to claim 7, wherein the first network has a plurality of nodes (**Referring to Fig. 2, Le Scolan illustrates Node A in the first network contains a plurality of nodes) See Col. 11 Lines 6-8**.

and the first network timing information is used to maintain synchronization of the plurality of nodes, (**The synchronized networks are described to be maintained, Le Scolan, See Col. 5 Lines 55-58).**

wherein the change in network timing information is sufficiently small to allow the plurality of nodes to maintain synchronization should one of the plurality of nodes not change its timing information in response to the sign of the difference communicated by the computer node, (**Kotaki, see Col. 4 line 63 – Col. 5 lines 1-5**).

Regarding Claim 10, Le Scolan discloses a method for allowing synchronization of a first network and a second network in a system comprising a plurality of network clusters(**See Fig. 2 & Col. 5 lines 25-33 i.e., "first, second network"**), wherein a number of network clusters comprise a plurality of computer nodes (**see Col. 10 lines 26-30 i.e., "other nodes" connected to sync node (Fig. 2 Item "CMa")**), the method comprising:

comparing network timing information (**see Col. 12 lines 17-31 i.e., reference time**) for the first network with network timing information for the second network (**see Col. 15 lines 10-31**) communicating to a plurality of other computer nodes in the first network a sign of the difference between the first network timing information and the second network timing information (**see Col. 15 lines 32-48 i.e., *"CMb" makes a correction in its cycle time register CTR in order to remain synchronized with the***

synchronization node "CMa" and then sends to all the nodes on communication bus "bB" (i.e., first network), cycle start signals in order to synchronize the different clocks of the nodes with the clock of the node "CMb")

Referring to Fig. 2, Le Scolan discloses the offset (*i.e., sign of the difference*) refers to the difference of reference time events between to buses "bA" and "bB" which are compared and communicated to cycle masters "Cma" and "Cmb" through respective interconnect nodes A,B, (**see Col. 15 lines 22-32 & Col. 10 lines 26-42**).

Le Scolan teaches a first network and second network are able to synchronize to one another by reading and calculating each of their respective clock pulses (*i.e., network timing information*) at the appearance of a reference event, (**see Col. 4 line 60 - Col. 5 lines 1-18**).

Le Scolan does not disclose that a network timing difference between the first network and the second network is thereby reduced by the plurality of other computer nodes in the first network responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign to avoid loss of local synchronization with the other computer nodes in the first network, the reduction of the timing differences being directed by the sign of the network timing difference between the first network and the second network, however the limitation is known in the art of communications by evidence of Kotaki (USP 5,726,659).

(Referring to Fig. 1, Kotaki illustrates a network station including a master station 11o and multiple slave stations "11i....11n", where *the master station finding a delay or gain time from time information sent from the slave station for each given time and reference time, finding a time correction coefficient and time correction number of the respective slave station on the basis of the given time and delay or gain time, and transmitting the time correction coefficient and time correction number to the slave station; and the respective slave station, responsive to each timer check signal of its internal timer, for calculating the time correction coefficient and time check signal sent from the master station to obtain a correction timer check signal, comparing a time correction number sent from the master station and its own time correction number, repeating a time correction operation until there occurs a coincidence between the two, and correcting a time difference between a reference time of the master station and an internal time of the respective slave station, <u>a plurality of times</u>, upon receipt of each timer check signal,* (**see Col. 2 lines 3-30**).

Kotaki discloses a network timing difference between a master station and a respective slave station (**see Col. 3 lines 8-12 i.e., timing difference |e|**) is corrected (*i.e., reduced or increased*) responsive to the sign of the difference received, (**see Col. 3 line 55 - Col. 4 lines 1-10**)

and in sufficiently small predetermined step values **(see Col. 3 lines 20-45 *i.e., predetermined time correction number N is assigned based on timing difference |e|, and a correction coefficient D)*** in accordance with the sign (**see *Col. 4 lines 25-***

51 i.e., time synchronization can be obtained between the master station and the slave station after 10 system times (small steps)).

Kotaki discloses the reduction of the timing differences being directed by the sign of the network timing difference, (**see Col. 2 lines 10-30 i.e.,** ***respective slave station repeats a time correction operation by reducing the time difference if the master station finds a gain time from the time information or increasing the time difference if the master station finds a delay from the time information)***

Kotaki teaches *since the time correction coefficient and time correction number as found based on the time difference of the respective slave station are sent to the slave station, it is possible to perform time correction at the respective slave station upon receipt of the time correction data. Further, the respective slave station can secure time synchronization (i.e., avoid local loss), while very small step like time correction is being done, enabling a proper processing or a smoother operation to be obtained in various control operations*, (**see Col. 4 line 63 – Col. 5 lines 1-5**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention for having the network timing difference between the first network and the second network thereby reduced by the plurality of other computer nodes in the first network responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign to avoid loss of local synchronization with the plurality of other computer nodes in the first network, the

reduction of the timing differences being directed by the sign of the network timing difference between the first network and the second network, by including the teachings of Kotaki who discloses a network timing difference between a master station and a respective slave station from a plurality of slave stations is corrected responsive to the sign of the difference received and in sufficiently small predetermined step values in accordance with the sign, within the teachings of Le Scolan who discloses comparing network timing information for the first network with network timing information for the second network, and for communicating to a plurality of other computer nodes in the first network a sign of the difference between the first network timing information and second network timing information, because the teaching lies in Kotaki, that a slave station can secure time synchronization while very small step like time correction is being done, enabling a proper processing or a smoother operation to be obtained in various control operations.

Regarding Claim 11, the combination of Le Scolan in view of Kotaki, disclose a computer node according to claim 1, wherein the first network comprises a first communication cycle and the second network comprises a second network cycle, **(Le Scolan, see Col. 12 lines 37-67)**

the sign of the difference between the first network timing information and the second network timing information indicates that the first communication cycle is ahead of the

second communication cycle. (**Le Scolan, see Col. 15 lines 10-48 i.e.,** ***node CMb makes a correction to the value contained in its cycle time register in order to remain synchronized (i.e., increase or decrease timing) with the synchronization node "CMA".***

(**Kotaki, see Col. 2 lines 10-30 i.e.,** ***respective slave station repeats a time correction operation by reducing the time difference if the master station finds a gain time (ahead) from the time information or increasing the time difference if the master station finds a delay from the time information***)

Regarding Claim 12, the combination of Le Scolan in view of Kotaki, disclose a computer node according to claim 1, wherein the synchronization unit is arranged to measure a time between a start of a first communication cycle of the first network and a start of a second communication cycle of the second network, (**Le Scolan, see Col. 12 lines 17-67 i.e.,** ***interconnection nodes A, B read and update (measure) cycle start signals***)

Regarding Claim 13, the combination of Le Scolan in view of Kotaki, disclose a system according to claim 7, wherein the first network comprises a first communication cycle and the second network comprises a second network cycle, **(Le Scolan, see Col. 12 lines 37-67)**

the sign of the difference between the first network timing information and the second network timing information indicates that the first communication cycle is ahead of the second communication cycle, (**Le Scolan, see Col. 15 lines 10-48 i.e., *node CMb makes a correction to the value contained in its cycle time register in order to remain synchronized (i.e., increase or decrease timing) with the synchronization node "CMA".***

(**Kotaki, see Col. 2 lines 10-30 i.e., *respective slave station repeats a time correction operation by reducing the time difference if the master station finds a gain time (ahead) from the time information or increasing the time difference if the master station finds a delay from the time information***)

Regarding Claim 14, the combination of Le Scolan in view of Kotaki disclose a system according to claim 7, wherein the synchronization unit is arranged to measure a time between a start of a first communication cycle of the first network and a start of a second communication cycle of the second network, (**Le Scolan, see Col. 12 lines 17-67 i.e., *interconnection nodes A, B read and update (measure) cycle start signals***)

Regarding Claim 15, the combination of Le Scolan in view of Kotaki disclose a method according to claim 10, wherein the first network comprises a first communication cycle

and the second network comprises a second network cycle, **(Le Scolan, see Col. 12 lines 37-67)**

the sign of the difference between the first network timing information and the second network timing information indicates that the first communication cycle is ahead of the second communication cycle, **(Le Scolan, see Col. 15 lines 10-48 i.e., *node CMb makes a correction to the value contained in its cycle time register in order to remain synchronized (i.e., increase or decrease timing) with the synchronization node "CMA".***

(Kotaki, see Col. 2 lines 10-30 i.e., *respective slave station repeats a time correction operation by reducing the time difference if the master station finds a gain time (ahead) from the time information or increasing the time difference if the master station finds a delay from the time information*)

Regarding Claim 16, the combination of Le Scolan in view of Kotaki disclose a method according to claim 10, wherein the synchronization unit measures a time between a start of a first communication cycle of the first network and a start of a second communication cycle of the second network, **(Le Scolan, see Col. 12 lines 17-67 i.e., *interconnection nodes A, B read and update (measure) cycle start signals*)**

Conclusion

4. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADNAN BAIG whose telephone number is (571) 270-7511. The examiner can normally be reached on Mon-Fri 7:30m-5:00pm eastern Every other Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on 571-272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ADNAN BAIG/
Examiner, Art Unit 2461

/Huy D Vu/

Supervisory Patent Examiner, Art Unit 2461